CHAPTER 3
RESEARCH DESIGN AND METHODOLOGY

3.1 STUDY DESIGN
This is a descriptive study using an analytic cross-sectional study design. The design is appropriate since a hypothesis will be tested by collecting descriptive data on a sample population at one point in time, which will then be compared to existing data to assist with developing norms, identifying trends and to inform and guide practice\(^{(40, 41)}\). Descriptive data was collected on a sample of an identified population which was measured in a single session. This data was then compared for two study populations, the Eastern Cape population and the American population where the variable was the results of the VMI test and Supplemental tests.

3.2 POPULATION
The population in this study consists of children who live in the Eastern Cape. According to findings of the 1995 household survey, the Eastern Cape is the third most populous province in South Africa\(^{(19)}\). As with most provinces the population group described as African is in the majority. Africans constitute 87%, Coloureds 7%, Whites 6% and Indians less than 1% of the population of Eastern Cape. The proportion of Coloureds in the province is larger than the proportion of Whites which is slightly different from the national trend\(^{(19)}\). Random sampling was done according to these statistics to ensure that the research sample was representative of these various population groups.

3.3 SAMPLE
The research sample consisted of 80 children aged 7 years 0 months to 7 years 3 months, attending schools in the Uitenhage metropolitan area. Beery used a total of 212 children in the 7-year-old category for his normative sample and did not specify the month distribution\(^{(4)}\). The candidate assumed that the number of children was equally distributed between the age categories of 7-year-old children and therefore divided the 212 children by 3 (7yr 0mo – 7yr 3mo; 7yr 4mo – 7yr 7mo; 7yr 8mo – 7yr 11mo) to arrive at the number of children used by
Beery for his normative sample. This sum then proposes that Beery used 70 children in the age category 7 years 0 months to 7 years 3 months. The sample of 80 children was chosen to be as close as possible to Beery’s sample size and 10 more were added to allow for any error that might occur during the assessments resulting in assessments that were not suitable for use and analysis.

3.3.1 Selection of schools

A list of all the primary schools in the Uitenhage area was forwarded to the candidate by the Eastern Cape Department of Education. These schools, which were government or privately funded schools, catered for a population of children without a known physical or mental disability that would influence their academic performance.

Systematic random sampling (42) was used to select the schools. The schools were sorted according to the population groups that predominantly attended the schools. The name of each school was written on a piece of paper and placed in one of three boxes marked African, White and Coloured. The candidate decided to exclude the Indian population from the research as the statistics indicated an Indian population of less than 1%, which would be 0.8 of 80 children and not significant to include in the study (19). Only one school was drawn out of the White box as only 5 children were needed for the sample. (6% of 80 children = 4.8) Similarly only one school was drawn out of the Coloured box, as only 5 children were needed for the sample. (7% of 80 children = 5.6)

The schools with the majority of African pupils were further subdivided according to socio-economic criteria. The size of houses in the area where the schools were situated was used as the criteria to determine if it is a low, middle or high socio-economic area. This was done to ensure a fairly equal representation of low, middle or high socio-economic classes in the sample. After results were obtained, children were reassigned to socio-economic groups according to a composite index derived by Riordan (31), where the classification of the breadwinner's occupation and highest level of education were used to determine if they were of low, middle or high socio-economic status. The African schools were therefore subdivided into 3 boxes marked African low, African middle and African high, accordingly.
As 70 African children were needed (87% of 80 children = 69.6), it was planned that two schools would be drawn out of the African low box, two out of the African middle box and two out of the African high box. The schools in the African high box included all population groups, but only African pupils in these schools were asked to participate. The principals of the selected schools were approached and asked if they were willing to participate in the study. *(Appendix C)* Two schools in the African low category did not wish to participate and additional schools were substituted by random selection until two schools were found where the principals were willing to participate.

The candidate planned to select 12 children in the required age category 7 years 0 months to 7 years 3 months, in each of the 6 selected African schools. This proved not to be possible, because there were insufficient numbers of children in the required age categories to constitute the 12 children required in each school selected. Rather than selecting more than the 6 African schools already selected, the candidate decided to start with the assessments in the 6 selected schools, and to return after a period of at least 3 months to select and assess a new group of children in the age category required to make up the numbers. Random sampling was used to select one of the two African schools in each socio-economic category already selected, in order to make up the numbers required in the specific age categories. This was done to assure that the candidate could finish the assessments within the planned time frame set out to complete the research. The schools were numbered as the candidate contacted the principals and they agreed to participate. The numbers have no specific meaning and assisted to maintain confidentiality for ethical reasons.

### 3.3.2 Selection of participants

Children between the age of 7 years 0 months and 7 years 3 months attending school in the Uitenhage metropolitan area without a known disability and mentally functioning within normal limits were selected.

### 3.3.2.1 Inclusion criteria:

- **Age:** 7 years 0 months to 7 years 3 months, irrespective of the Grade they are in.
• **Sex:** An equal number of males and females were to be included in the study.

• **Socio-economic status:** An equal number of children of low, middle and high socio-economic classes were to be included in the study. To assist with this equal distribution, schools were firstly selected according to the size of the houses in the areas. For a more accurate division, children participating in the study would then later be reassigned to socio-economic groups, according to a composite index derived by Riordan\(^{(31)}\), where the classification of the breadwinner’s occupation and highest level of education were used to determine if they were of low, middle or high socio-economic status. On the consent form, the parents/guardian had to fill in the breadwinner’s occupation and highest level of education to make it possible to use this index. (Appendix A) This index was selected because it used the breadwinner’s occupation and highest educational level and was less threatening than asking parents for their actual income. The information obtained was used to divide the sample into three socio-economic groups for data analysis purposes and to further analyse the information derived from this research.

### Table 3.1 Classification of Breadwinner’s occupation\(^{(31)}\)

<table>
<thead>
<tr>
<th>Occupational classification</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top professional, executive, administrative and technical occupations</td>
<td>9</td>
</tr>
<tr>
<td>Professional, administrative and managerial workers</td>
<td>8</td>
</tr>
<tr>
<td>Independent commercial</td>
<td>7</td>
</tr>
<tr>
<td>Lower grade administrative, technical and clerical, limited supervisory and administrative responsibility</td>
<td>6</td>
</tr>
<tr>
<td>Artisans and skilled workers with trade qualifications</td>
<td>5</td>
</tr>
<tr>
<td>Routine clerical and administrative workers, service and sales workers</td>
<td>4</td>
</tr>
<tr>
<td>Semi-skilled production and manual workers</td>
<td>3</td>
</tr>
<tr>
<td>Unskilled production and manual workers</td>
<td>2</td>
</tr>
<tr>
<td>Not economically active or productive</td>
<td>1</td>
</tr>
<tr>
<td>No response</td>
<td>0</td>
</tr>
</tbody>
</table>
Another score was given according to the breadwinner’s highest level of education as indicated in table 3.2

Table 3.2 Classification of Breadwinner’s education (31)

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>University attendance</td>
<td>7</td>
</tr>
<tr>
<td>Post-matric training (year/grade 12 (not university)</td>
<td>6</td>
</tr>
<tr>
<td>Matric (year/grade 12)</td>
<td>5</td>
</tr>
<tr>
<td>Apprenticeship</td>
<td>4</td>
</tr>
<tr>
<td>Junior Certificate</td>
<td>3</td>
</tr>
<tr>
<td>Primary school</td>
<td>2</td>
</tr>
<tr>
<td>None at all</td>
<td>1</td>
</tr>
<tr>
<td>No response</td>
<td>0</td>
</tr>
</tbody>
</table>

The total score derived from the breadwinner’s occupation and highest education level provided the classification of lower, middle or high socio-economic status as indicated in table 3.3.

Table 3.3 Classification of socio-economic status (31)

<table>
<thead>
<tr>
<th></th>
<th>Lower</th>
<th>Middle</th>
<th>Upper (high)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>2-10</td>
<td>11-13</td>
<td>14-16</td>
</tr>
<tr>
<td>Coloured</td>
<td>2-6</td>
<td>7-10</td>
<td>11-16</td>
</tr>
<tr>
<td>Black</td>
<td>2-5</td>
<td>6-10</td>
<td>11-16</td>
</tr>
</tbody>
</table>

3.3.2.2 Exclusion criteria:

- Children considered by the school staff to have a specific learning disability or who were suspected of being mentally retarded were to be excluded.
- Children that did not want to participate.
- Children had to be excluded if their parents did not sign the consent forms and if the forms were not sent back to the school in time before the planned date of assessment.
The candidate planned to ask the principals of each school to randomly select a specific number of children from the class lists according to the selection criteria. They would then be asked to fill in the names of the selected children on the information (Appendix D) and consent forms (Appendix A) and monitor that the forms are sent home for the parents to fill in and sign. It was planned to select an equal amount of children from each school.

The plan failed because:

- There were limited numbers of children in the required age group (7 years 0 months to 7 years 3 months) and an equal number of children could thus not be selected in the different schools.
- The principals did not have time to do the selection and fill in the forms.
- In the first school where testing was undertaken, the selection was done by one of the teachers appointed by the principal. This was a problem because she also included children in the wrong age group and when the candidate arrived to do the testing, many of the children could not be tested because they did not meet the age requirement.
- In the African low category it took a long time for the consent forms to be returned by the parents. By the time the forms were returned some of the children selected no longer met the age criteria for inclusion.

As a result, the following changes were made:

- The candidate asked the principals of the selected schools for permission to do the selection from the class lists herself.
- The candidate filled in the names and birth dates of the selected children on the consent forms and information letters.
- The candidate placed all the forms of each class in an envelope and wrote a control list for the class teacher to monitor the return of the signed consent forms.
- The candidate asked the principal to contact her as soon as all the signed consent forms were received back. A cut-off date was stipulated to ensure the selected children would still be the appropriate age once the forms where received back.
- The candidate selected all the children in the age group from the class lists, because of the limited number of children in the appropriate age group and the problems in
getting the signed consent forms back. This resulted in the number of children selected between the schools not being equal.

- Once the consent forms had been returned each child was asked verbally if they wished to participate and if they gave verbal assent they were then included in the study.

3.4 RESEARCH INSTRUMENT

The instrument selected for this research was the VMI test’s fourth revised edition.

The major difference between the fourth revised edition of the VMI test and previous versions is that there is the option of choosing to do the two supplemental tests in addition to the VMI test. The VMI test’s new standardized supplemental tests\(^4\) can be administered to determine if the problem is in the visual perceptual area (by using the Supplemental test for Visual perception) or in the motor area (by using the Supplemental test for Motor Coordination). For the purpose of this study the candidate decided to include both the supplemental tests. This will assure more comprehensive results.

Thus the test booklets used in this research study consisted of:

- The Beery-Buktenica Developmental Test of Visual-motor Integration\(^4\) 
  \textit{(Appendix E)}
- The Beery-Buktenica Supplemental Developmental Test of Visual Perception\(^4\) 
  \textit{(Appendix F)}
- The Beery-Buktenica Supplemental Developmental Test of Motor Coordination\(^4\) 
  \textit{(Appendix G)}

3.4.1 The Beery-Buktenica Developmental Test of Visual-motor Integration (4\textsuperscript{th} Edition, Revised) (VMI test)

This test consists of a developmental sequence of 27 geometric forms, printed on light green paper in a booklet form. \textit{(Appendix E)} The forms need to be copied with a pencil. The full 27-item VMI test can be administered either in a group or individually in about 10 to 15 minutes.\(^4\)
Criteria are provided in the test manual for scoring the reproduced designs on a pass/fail basis. A child is given credit for each design passed until three consecutive failures are encountered. The test has no time limit.

3.4.2 The Beery-Buktenica Supplemental Developmental Test of Visual Perception (STVP)

This test is printed on both sides of a light blue A3 sheet of paper. (Appendix F) The test uses the same stimulus forms as the VMI test. In the STVP one geometric form that is exactly the same as each stimulus needs to be chosen from among others that are not exactly the same as the stimulus. During a three-minute timed period, the task is to identify the exact match for as many of the 27 stimuli as possible. In order to make this as pure a visual perceptual task as possible, the motor requirements of the task are reduced to a minimum by having the child simply point to his choices. The test administrator marks the response on the test each time. The test needs to be administered individually. The test is discontinued after three consecutive errors, or after three minutes.

3.4.3 The Beery-Buktenica Supplemental Developmental Test of Motor Coordination (STMC)

This test is printed on both sides of a cream coloured A3 sheet of paper. (Appendix G) In the STMC the task is to simply trace the stimulus forms with a pencil without going outside double-lined paths in a five minute timed period. The test needs to be administered individually. Visual perceptual demands have been reduced greatly by providing examples, starting dots and paths as strong visual guides for the required motor performance. The test uses the same stimulus forms as the VMI test. The test is discontinued after five minutes and should not be stopped after three consecutive errors.

3.4.4 Test Materials

- Sharpened number 2 pencil without eraser or soft primary pencil or ballpoint pen for each child.
- Extra pencils to use if pencil points break during testing.
- Stopwatch to time the Supplemental tests.
• One Test booklet of each test for each child.
• Test instructions in the language of the children being tested.

3.4.5 Test translation
In a study done by Helm\(^{(16)}\), the test instructions of the VMI test were translated into Xhosa. In her summary chapter she wrote:

"She hopes that the inclusion in this study of translations of the test instructions might increase the validity of the test." (p.155)

There was no evidence in the literature or test manual to suggest that the translation of the instructions will influence the validity of the results. Dunn, Loxton and Naidoo identified that the translation of the VMI test instructions does not have an influence on the reliability of the test since it has limited verbal instructions\(^{(28)}\). For the purpose of this study it was assumed that the translation of the instructions will assist the children with their understanding and will not have a negative influence on the validity of the results.

To ensure a good translation, the candidate used a similar method to that used by Helm. The test instructions of the VMI test and Supplemental Tests were translated into Xhosa and Afrikaans to be presented in the children's home language. The instructions were translated into Xhosa by a Xhosa teacher and translated back into English by another Xhosa teacher. Each translation was adjusted and translated back into Xhosa. A similar method was used for the Afrikaans test instructions. The translations are included as Appendix H.

The participants were grouped together according to home language when tested on the VMI test and groups were not larger than 10. According to Beery, children in the first grade could be tested as an entire class, but the candidate decided to limit the number of participants in a group to 10 to make it more manageable and easier to control when administering the test. This was also done because the candidate had to control the signed consent forms and number the tests before the participants could start the test.
3.5 TEST VENUES

3.5.1 Group test venue
The participants were assessed at their schools. For the group assessment of the visual-motor integration part of the test the school staff prepared a classroom in advance. The correct number of regular school desks and chairs were placed facing the blackboard. Aisles were left between the desks to allow the test administrator to have easy access to every child. All school materials e.g. books, erasers, rulers and pencils were removed from the desks prior to testing. Other staff and participants were instructed not to enter the classroom during the testing. To minimize interruptions, a sign was placed on the door of the classroom to indicate that testing was in progress. Lighting and ventilation were adequate.

3.5.2 Individual test venue
For the individual assessment of the Supplemental tests the candidate used any available empty classroom or room with at least one desk in it. The reason for this was that the individual testing took longer to administer, so the candidate had to use a room that would not disrupt the school program. Other staff and participants were instructed not to enter the room during testing. To minimize interruptions, a sign was placed on the door of the classroom to indicate that testing was in progress.

3.6 DATA COLLECTION PROCESS

3.6.1 Testing procedures
After all the consent forms were received from a school, or when the cut-off date was reached, the principal contacted the candidate and a suitable assessment time was booked to fit in with the school program. The most suitable time for most of the schools was first thing in the morning.

Vally showed that regardless of the language used to give instructions, the simplicity of the instructions ensures that even with translation the VMI test is administered in a standardized fashion\(^{43}\). The candidate planned to use the class teacher at the schools with Xhosa-speaking participants to assist her as interpreter during the group and the individual tests. It was planned that they would be trained as an interpreter to adhere to the administration methods.
of the assessments. This proved impossible due to constraints on the teachers’ time. The candidate therefore trained a former teacher to act as interpreter. Ms. Sylvia Dlala, who spoke Xhosa as her home language and former teacher, familiar to the researcher for many years, was trained for this purpose. She accompanied the candidate to all the schools with Xhosa speaking participants and acted as interpreter. She used the Xhosa translation of the instructions.

Since the candidate is fluent in Afrikaans and English, no interpreter was needed for the Afrikaans and English speaking participants. The candidate used the Afrikaans translations of the test instructions for the Afrikaans speaking children and the original instructions for the English speaking children.

Each class teacher had a list of the participants in the class that were involved in the study. At the schools where Xhosa speaking participants were assessed, the candidate and Ms. Dlala, the interpreter, went to each class 15 minutes before the arranged time. We introduced ourselves to the class and read out the names of the participants that had to go with us for the assessment. Using Ms. Dlala to interpret, the participants were asked if they were happy to go for the assessment and they had the opportunity on the day, to withdraw if they wanted to. The participants were all very enthusiastic about their inclusion in the study and none withdrew. The participants then walked to the already prepared test venue, accompanied by the candidate and Mrs. Dlala.

A similar method was used at the schools where Afrikaans and English speaking participants were assessed. The only difference was that the candidate went to these schools alone, since she is fluent in Afrikaans and English and therefore there was no need to use an interpreter.

3.6.2 Test instructions
Assessment of the participants started with the VMI test, administered in groups of 10, followed by the individual administration of the Supplemental Developmental Test of Visual Perception and Supplemental Developmental Test of Motor Coordination. The tests were administered on the same day and in this order as stated in the manual (4).
Ms Dlala used the exact wording for the Xhosa speaking participants, according to the translated Xhosa test instructions (Appendix H) and did not try to help or encourage the participants. This added to the validity of the test results, being a standardized test. The participants could identify with her and seemed comfortable in her presence and the test results could be considered reliable.

The candidate used the exact wording for the English speaking participants, according to the test manual\(^4\) and the exact wording for the Afrikaans speaking participants, according to the translated Afrikaans test instructions (Appendix H) and did not try to help or encourage the participants. This added to the validity of the test results, being a standardized test. The participants appeared comfortable in the presence of the candidate and the test results could be considered reliable.

### 3.6.3 Test scoring

The candidate scored all the tests according to the test manual\(^4\). Scoring of the VMI test was done on the scoring sheet provided on the front page of the VMI test booklet. Accurate scoring of the VMI test is dependent on the skill and experience of the test administrator\(^{27}\). At the time these assessments were done, the candidate had 16 years of experience in administering and scoring this test. The candidate’s skill in administering and scoring the VMI test could add to the reliability of the test results. Since this was a descriptive study there was no need for a blinded assessor, but it should be noted that the danger of this could be that the candidate’s style of administering and scoring could influence the results. According to the 1996 norming study, the interscorer reliability of all three tests are very high, confirming that since the candidate administered and scored all the tests, it could add to a consistency in the procedure rather than result in an error of scoring or interpretation\(^4\).

Each child’s raw score was converted to a standard score by using the manual of the test. This was done for each of the three tests separately. Standard scores achieved on each test were compared to a normal distribution curve using the standard score interpretation table as explained by Beery in the test manual on page 94\(^4\).
Table 3.4 Standard score interpretation

<table>
<thead>
<tr>
<th>Standard Score</th>
<th>Performance</th>
<th>Group % of Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>133 – 160</td>
<td>Very High</td>
<td>2</td>
</tr>
<tr>
<td>118 – 132</td>
<td>High</td>
<td>14</td>
</tr>
<tr>
<td>83 – 117</td>
<td>Average</td>
<td>68</td>
</tr>
<tr>
<td>68 – 82</td>
<td>Low</td>
<td>14</td>
</tr>
<tr>
<td>40 – 67</td>
<td>Very Low</td>
<td>2</td>
</tr>
</tbody>
</table>

3.6.4 Ethical considerations

The candidate obtained permission from the Eastern Cape Department of Education to perform the research in schools in the area. Conditional permission was granted in a letter by Dr. D.S. Steenkamp. *(Appendix I)* The letter stated that a copy of the permission letter should be included when principals and school governing bodies are approached and a suitable time should be selected to limit disruption of the school time-table and preparations for examinations. The research sample should be representative of the various population groups. The candidate should administer the tests and the principal concerned should give permission if the class teachers were to be used as interpreters. The candidate adhered to all these conditions and included all necessary ethical principles in terms of informed consent, signed permission from the participants’ parents/guardians, verbal assent from the participants and offering the right to withdraw. Consent forms were numbered and the same numbers were used on the participants’ test booklets for confidentiality purposes. Ethical clearance was obtained from the Committee for Research on Human Subjects at the University of the Witwatersrand and the ethical clearance number for this project is M02-09-43. A copy of the ethical clearance form is included as Appendix J.

3.7 DATA ANALYSIS

Descriptive analysis was done on the representative sample in terms of socio-economic status, gender and race.

The chi-squared test for association was used to determine if the difference between the observed results and expected results had statistical significance. For the chi-squared test to be valid, at least 80% of the expected frequencies should exceed 5, while all expected
frequencies should exceed 1. To increase the expected frequencies to these values, the very low and low categories were combined and the very high and high categories were combined. Since the chi-squared test should be used with frequencies and not percentages, the expected frequencies were calculated and given as the number of participants expected to achieve the results in each category.

Socio-economic status was determined according to a score assigned to the breadwinner’s occupation and highest level of education. The assessment results were then grouped according to the three socio-economic groups, low, middle and high. The mean and standard deviation (sd) were calculated for each group and compared according to a one-way analysis of variance (ANOVA) with the Bonferroni correction for multiple comparisons. The Bonferroni method is easy to interpret and can be used when comparing data of less than five pairs. These comparisons were made to establish if there was a difference in the performance between these different groups. This was done separately for each of the three tests. ANOVA uses F-statistics and its probability values (p values) to determine if the differences among the sample means are statistically significant. This was done for the entire group and also for the African participants separately to provide more information as this group of participants was large enough (N=70), to be used separately for interpretation of results.

The test results of the sample were then grouped according to gender. The test results were analysed separately for each of the three tests. The same method was used to compare the performance of males and females in the sample. This was done for the entire group, and for the African participants separately to provide more information.

The test results of the sample were also grouped according to population group and again the data for each of the three tests was analysed separately. The same method as described above was used to compare the performance of the different population groups.

Because Beery did not include raw scores in his test manual, it was not possible to compare the test results of the sample in this study directly to the results of the American sample.
Statistician Dr. Piet Becker recommended the use of a one-sample t test to compare the mean of a single column of numbers against a hypothetical mean. (Becker, P, verbal communication, 23 September 2004) All three of the tests were scored using the test manual and standard scores were used for the t test analysis with the mean set at 100. A p-value is computed from the t ratio and the numbers of degrees of freedom (which equals sample size minus 1)\textsuperscript{45}.

To establish if a difference exists between the scores obtained by American and South African children each participant’s raw score was converted to a standard score by using the manual of the test. This was done for each of the three tests separately. The results were analyzed together, using a method of analysis called the pooled variance-t. This analysis determines if the mean of the standard scores is statistically significantly different from 100. To be significant at the 0.05 level, the p-value must be less than 0.016667. The scores in the manual are the normed scores for American children so any statistical significant difference will indicate a difference between the participants from the two countries.

In determining the p-value, it is important to distinguish whether the results are “statistically significant” or “scientifically important”\textsuperscript{45}. One needs to use scientific judgement to decide how large the difference should be between the population mean and the hypothetical mean to be considered scientifically important. For this reason, the p-value is observed from both ends of the confidence level. If the p-value is smaller than 0.05, it is unlikely that the discrepancy between the sample mean and the hypothetical mean is due to coincidence of random sampling. The difference is then statistically significant. To decide if it is also scientifically significant, the confidence interval is observed. The confidence interval indicates that one can be 95% sure that this interval contains the true difference between the population mean and the hypothetical mean. If even the lower end of the confidence interval is large enough to be considered significant, one can conclude that the data have a mean distinct from the hypothetical value and the discrepancy is large enough to also be scientifically relevant\textsuperscript{45}.
When compiling new scores for a South African population, the participants were grouped together for each test according to age groups as indicated in the manual\(^2\). For the VMI test, raw scores of participants were grouped according to age groups 7 years 0 months to 7 years 1 month and 7 years 2 months to 7 years 3 months. For the Supplemental tests, raw scores were grouped according to age groups 7 years 0 months to 7 years 3 months. New scores were compiled for the South African population by converting raw scores to Z-scores. A Z-score is a score that indicates how many standard deviations an observation is from the mean of the distribution. The Z-scores were converted to standard scores using 15 as the standard deviation (sd) and 100 as the mean.

**SUMMARY**

This is a study of the results obtained on:

- The Beery-Buktenica Developmental Test of Visual-motor Integration,
- The Beery-Buktenica Supplemental Developmental Tests of Visual Perception and
- The Beery-Buktenica Supplemental Developmental Tests of Motor Coordination

on a sample of normal 7 year 0 month to 7 year 3 month old participants, representative of an Eastern Cape population in South Africa. The results will be analyzed and compared to determine differences between socio-economic groups, race and gender within the sample. The results of this sample will then be compared to the American sample to determine if the VMI test and Supplemental tests are valid for this population and if not, new South African scores will be compiled.